

LOCAL STORMS.

December **31st**.—A gale from the nw. demolished buildings at Wichita Falls, Tex. **1st**.—2 a. m., a severe storm moved northeast over Keatchie, La., destroying property to the value of about \$10,000. At Beatrice, Nebr., a wind storm caused damage to frail buildings, etc. At Little Rock, Ark., a severe thunder-storm occurred about 2 a. m., with heavy rain and high wind. The wind reached a velocity of 34 miles per hour from the sw., and trees and fences were blown down. At Milwaukee, Wis., the heaviest storm of the season prevailed. Rain changed to sleet and sleet to snow which continued until after midnight. The wind reached a velocity of 50 miles per hour at 8.10 a. m., and an extreme velocity of 90 miles at 8.07 p. m. from the n. and ne. The water-works crib was injured, and 90 feet of the breakwater were destroyed. A heavy wind and snow storm prevailed at Green Bay, Wis. At Leavenworth, Kans., rain changed to sleet, and sleet to snow, and high n. to nw. winds prevailed. Considerable damage was caused to electric wires, and railroad traffic was interrupted. At Topeka, Kans., a heavy storm of wind, and rain changing into snow, followed a thunder-storm which occurred December 31st. The snow drifted heavily, interrupting railroad and street traffic.

The night of the 1st-2d a heavy nw. to ne. gale prevailed at Chicago, Ill., the wind reaching a velocity of 54 miles per hour from the ne. the morning of the 2d. **2d**.—A barn was struck by lightning and telegraph wires were damaged at Athol, Mass., in the afternoon. **7th**.—Between 3 and 4 p. m. a tornado moving in a southerly direction passed near Shiner and Yoakum, Tex., in a path about 100 yards in width. It appeared as a black, funnel-shaped cloud and was attended by a roaring noise. One person was killed near Shiner, 4 others were seriously injured, and several houses were reported destroyed. At Palestine, Tex., heavy rain caused damage to railroads. At New York City light rain, freezing as it fell, prevailed. Many electric wires were broken under the weight of ice. **8th**.—High wind prevailed over the west Gulf and some damage was caused to vessels and cargoes of cotton at Galveston, Tex. **9th**.—High wind and rain continued at Pensacola, Fla. Maximum velocity 42 miles per hour from the se. at 5.30 a. m. Considerable timber was lost in the bay, and a fishing smack was driven ashore and wrecked. **11th**.—A sw. gale and rain prevailed at Baltimore, Md. In the lower anchorage vessels dragged their anchors, and 2 vessels were reported aground. A large quantity of drift ice was brought up to the city by the wind and high tide. A heavy gale prevailed off Cape Hatteras, and great damage was caused to property along the middle Atlantic and south New England coasts by high wind and heavy rain. The rainfall was especially heavy in central and east Pennsylvania, where streams flooded their banks and submerged low lands.

12th.—Heavy rain and high wind in conjunction with exceptionally high tides caused great damage along the New Jersey and New England coasts. Ice gorges formed in many streams, causing the overflow of low lands. On the Nova

Scotia and east Maine coasts the tide was reported the highest ever known. At Eastport, Me., the wind reached a velocity of 42 miles per hour from the se. at 8.20 p. m., and the barometer, which fell to 28.91, was lower than for several years. The tide was the highest on record, exceeding the high tide of 1869 by 5 inches. Much damage was caused to wharves and to buildings along the water front. At New Brunswick, N. J., all factories were compelled to suspend work on account of an overflow from the Raritan River due to an ice gorge $\frac{1}{2}$ mile below the city. **17th**.—A severe wind, rain, and sleet storm prevailed along the Hudson River and extended over New England on the 18th. The rain froze as it fell, causing great damage to electric wires and trees. **22d**.—A heavy storm of wind and rain prevailed over the Atlantic coast states from North Carolina to Massachusetts. At Wilmington, N. C., the wind reached a velocity of 43 miles per hour from the sw. at 8.40 a. m., without causing serious damage. At Hatteras, N. C., a s. gale prevailed during the morning. Two schooners were wrecked on the North Carolina coast. A heavy rain storm swept over the Wyoming Valley, Pa., doing extensive damage in low-lying districts, and submerging a part of Wilkes Barre. Great damage was caused by heavy rain and freshets in streams in New Jersey. A severe wind and rain storm prevailed over east New York and Connecticut, causing much damage by the overflow of streams. At Birmingham, Conn., the dam used to divert the water of the Housatonic River into an artificial channel for the use of factories gave way and was damaged to the extent of about \$200,000. At Southington, Conn., factories were closed and railroads submerged. The storm was also very destructive along the Massachusetts coast.

25th.—A severe storm of wind, rain, sleet, and snow prevailed in the middle Atlantic states and New England, causing an almost entire suspension of telegraphic communication. Referring to a reported fall of fish at Nashville, Tenn., during a storm of the 26th, the observer at that place states that on the morning of that date a fire occurred, and, as the pumps of the water works were out of order, the water in the reservoir was low. Small fish in the bottom of the reservoir were brought through the pipes to the city. The firemen observing them passing through the hose while washing their engine threw a stream into the air and the fish were scattered about the street. Persons seeing them concluded that they had descended with the snow which was falling at the time.

29th.—Thunder-storms were reported in Ohio, Pennsylvania, and New York. A thunder-storm, with violent wind and hail, moved northeast over Wellsborough, Pa., between 10.30 and 11.15 a. m. **31st**.—At 3 p. m. a tornado passed northeast over Palo Alto, Miss. The cloud which was black and funnel-shaped was attended by a roaring sound and heavy rain and hail. One person was fatally and several seriously injured; and a number of buildings and a quantity of timber were levelled to the ground. The total damage to buildings in the county was estimated at \$10,000. **30th-31st**.—Heavy rain fell during the night at Memphis, Tenn., flooding streets and sewers. Thunder was heard the afternoon of the 31st.

INLAND NAVIGATION.

ICE IN RIVERS AND HARBORS.

Lake Huron.—On the 7th the lake was frozen at Port Huron, Mich. The night of the 21st an ice gorge formed at the foot of Lake Huron, and the water in the Saint Clair and Black rivers fell one foot.

Green Bay.—On the 5th the bay was frozen at Green Bay, Wis. A report from Sturgeon Bay of this date stated that the bay was free from ice at that point.

Lake Champlain was reported closed at Burlington, Vt., on the 27th.

Hudson River.—On the 3d and 5th heavy drift ice impeded navigation in the Hudson and East rivers at New York City.

Delaware River.—Navigation was resumed at Beverly, N. J., on the 19th. At Philadelphia, Pa., the Delaware and Schuylkill rivers were free from ice after the 15th.

Lake Erie.—On the 27th drift ice was noted in the Niagara River at Buffalo, N. Y., and on the 30th there was floating ice in the river and harbor.

Ohio River.—Large cakes of floating ice interfered with navigation at Parkersburgh, W. Va., on the 3d, and drift ice

was reported on the 5th, 7th, and 8th. At Marietta, Ohio, floating ice was reported on the 4th, 8th, 9th, 11th, and 20th.

Detroit River.—Floating ice at Detroit, Mich., on the 2d, 5th to 7th, 9th, 12th, 13th, 15th to 18th, and 25th to 27th.

Saint Clair River.—On the 4th the river was full of floating ice at Port Huron, Mich. On the 10th the river was closed by an ice jam 12 miles south of Port Huron. A steamer plying between Port Huron and Marine City was obliged to lay up after having made daily trips for 22 months.

Mississippi River.—Floating ice at Davenport, Iowa, 2d to 7th, 12th to 14th, 24th, and 25th. Floating ice at Alton, Ill., 9th to 15th; ice disappeared 16th.

Missouri River.—At Fort Sully, S. Dak., the river was frozen during the month. At Sioux City, Iowa, the river was frozen on the 4th. Floating ice at Leavenworth, Kans., 1st to 10th, and 21st to 29th. Floating ice at Saint Joseph, Mo., 2d, 3d, 5th, 6th, 11th to 13th, 16th, 21st, 22d, 24th, and 26th to 31st. Floating ice at Hermann, Mo., 14th and 15th.

FLOODS.

At Pittsburgh, Pa., the Monongahela River rose rapidly from the 1st to 3d, reaching 23.2 feet, 1.2 feet above the danger-line on the gauge, about 6 a. m., 3d, after which it fell slowly. The tracks of the Pittsburgh and Western Railroad and a part of the 1st ward in Allegheny City were under water. On the 2d the Ohio River was rising rapidly at Cincinnati, Ohio, and the river was full of drift. The river continued to rise until the 6th, when it reached 48.7 feet, at which point it remained several hours and then began to recede. Basements of buildings at the corner of River and Maine streets were flooded at noon of the 4th, when the river-gauge reading was 45.1 feet. On the 3d, 4th, 5th, 22d, 23d, and 30th the Tennessee River was rising at Chattanooga, Tenn., and considerable drift wood passed down. On the 10th heavy rain and melting snow caused streams to overflow and inundate low lands in Westchester Co., N. Y. On the 11th and 12th floods occurred in west New England, east New York, and east Pennsylvania. Ice gorges and unusually high water caused damaging floods in the Housatonic and Naugatuck valleys, Conn. Near Rond-

out, N. Y., ice jams flooded streams. At New York City the high wind backed the water into Battery Park, washing away benches and depositing drift wood. Heavy rain and melting snow caused floods in the Schuylkill and Lehigh valleys, Pa. Considerable damage was caused at and near Allentown, Pa. On the 22d floods occurred in west Massachusetts, Connecticut, east New York, and east Pennsylvania, where great destruction to property was caused.

Heights of rivers above low-water mark, January, 1891 (in feet and tenths).

Stations.	Danger- point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River.</i>						
Shreveport, La.	29.9	31	24.1	1	9.8	14.3
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	18	11.6	31	5.0	6.6
Little Rock, Ark.	23.0	13	15.2	30	9.3	5.9
<i>Missouri River.</i>						
Fort Buford, N. Dak. * ..	21.0	31	6.4	7, 8	2.7	3.9
<i>Mississippi River.</i>						
Saint Paul, Minn. *	14.5					
La Crosse, Wis. *	13.0					
Dubuque, Iowa *	16.0					
Davenport, Iowa	15.0	4, 14	2.1	22, 23	0.7	1.4
Keokuk, Iowa	14.0	1	1.8	26	0.1	1.9
Saint Louis, Mo.	32.0	8, 9	5.3	1	2.9	2.4
Cairo, Ill.	40.0	12, 13	32.2	26	21.9	10.3
Memphis, Tenn.	34.6	15, 16	24.3	1	10.3	14.0
Vicksburg, Miss.	41.0	20, 21	33.6	1	11.8	21.8
New Orleans, La.	13.0	28	12.0	5	4.2	7.8
<i>Ohio River.</i>						
Pittsburgh, Pa.	22.0	3	23.2	10	4.5	18.7
Parkersburg, W. Va.	38.0	4	34.5	11	9.2	25.3
Cincinnati, Ohio	50.0	6	48.7	23	21.0	27.7
Louisville, Ky.	25.0	7	22.0	23	9.3	12.7
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	15	25.1	22	11.8	13.3
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	5	15.5	10	6.3	9.2
Knoxville, Tenn.		4	9.1	31	3.0	6.1
<i>Monongahela River.</i>						
Pittsburgh, Pa.	29.0	3	23.2	10	4.5	18.7
<i>Savannah River.</i>						
Augusta, Ga.	32.0	13	21.3	3	7.3	14.0
<i>Willamette River.</i>						
Portland, Oregon.	15.0	16	3.7	20, 21, 22	1.0	2.7

* Frozen.

MISCELLANEOUS PHENOMENA.

SUN SPOTS.

Haverford College Observatory, Pa. (observed by Prof. F. P. Leavenworth):

Date.	Number of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Faculae.	Remarks.
	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.		
Jan., 1891.										
2, 3 p. m.	0	0	0	0	0	0	0	0	1	Definition bad.
3, 10 a. m.	0	0	0	0	0	0	0	0	1	Definition poor.
4, 10 a. m.	0	0	0	0	0	0	0	0	1	Definition poor.
5, 12 m.	1	3	0	0	0	0	1	3	3	Definition fair; spots small.
6, 9 a. m.	2	4	0	0	0	0	3	7	2	Definition fair; 1 spot veiled.
7, 9 a. m.	0	0	0	0	0	0	1	5	2	Definition poor.
8, 4 p. m.	1	1	0	0	0	0	2	4	1	Definition poor.
9, 10 a. m.	0	1	0	0	0	0	2	3	1	Definition poor.
12, 10 a. m.	0	0	0	0	0	0	0	0	2	Definition fair.
13, 9 a. m.	0	0	0	0	0	0	0	0	0	Definition good.
14, 10 a. m.	0	0	0	0	0	0	0	0	0	Definition poor.
15, 3 p. m.	1	4	0	0	0	0	1	4	1	Definition fair; 1 spot very large.
16, 10 a. m.	0	5	0	0	0	0	1	9	1	Definition fair; 1 spot very large.
18, 3 p. m.	2	10	0	0	0	0	3	19	1	Definition fair; 1 spot very large.
19, 10 a. m.	0	2	0	0	0	0	0	21	1	Definition fair; 1 spot very large.
21, 10 a. m.	0	0	0	0	0	0	1	1	0	Definition bad; 1 spot very large.
22, 4 p. m.	0	0	0	0	0	0	2	13	0	Definition fair.
23, 10 a. m.	0	10	0	0	0	0	2	23	0	Definition fine.
24, 10 a. m.	2	7	0	0	0	0	4	28	2	Definition good.
26, 2 p. m.	0	8	0	0	0	0	4	36	2	Definition fair.
27, 9 a. m.	0	4	0	0	0	0	4	40	3	Definition fair; several large spots.
28, 9 a. m.	0	5	0	0	0	0	4	45	3	Definition fair.
30, 10 a. m.	0	0	1	2	0	0	3	28	1	Definition fair; 1 large spot.

Mr. D. E. Hadden, Alta, Iowa: 4th, small faculae near ne. and sw. limbs. 6th, faculae mottling on e. limb. 7th, glimpses of faculae through clouds. 15th, 1 group, 1 spot; large spot by rotation on se. edge of limb. 16th, 1 group, 4 spots; large spot had finely developed umbra and penumbra, with faculae surrounding and faculae on e. limb. 17th, 1 group, 4 spots; appearance unchanged. 18th, 2 groups, 6 spots; large spot unchanged in appearance; small new group in nw.; large area of faculae on se. limb. 19th, 2 groups, 6 spots. 20th, 2 groups, 4 spots; group nw., vanishing, faculae surrounding it. 23d, 1 group, 6 or 8 spots; glimpses through clouds; large spot sw.; numerous small spots, could not be seen on account of clouds. 24th, 1 group, spots could not be seen on account of clouds. 25th, 3 groups, 9 spots; large spot in sw. still had well-developed umbra and penumbra; 1 new group 1 day w. of meridian in s. latitude; other group surrounded by faculae on e. limb with 5 or 6 spots; it appeared by rotation. 26th, 4 groups, 10 spots; new group by rotation on e. limb with faculae 1 day e. of group number 3. 27th, 3 groups; too hazy to see faculae or count spots; large spot on w. limb, disappearing by solar rotation, having completed transit in 13 days. 29th, 2 groups, 8 spots; groups in n. latitude; faculae disappearing on w. limb. 30th, 2 groups, 8 or 10 spots; large group diminishing in size and brilliancy. Cloudy 1st, 9th, 21st, 22d, 28th, 31st.

Mr. John W. James, Riley, Ill.: 1st to 14th, observations on 9 days, none seen. 15th, large spot on east edge. 17th, 2 new small spots southwest of large one. 19th, immense areas of faculae, and 1 faint spot near east limb. 22d, only